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SUGARCANE PLANTER PROGRESS REPORT FOR 1956 1/

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The 1956 sugarcane planter research program, conducted in cooperation with the American Sugar Cane League, was concentrated on improving the two-row planter built in 1955. The service requirements for the planter were as follows:

1. The planter shall be tractor-mounted to facilitate planting the ends of the rows and turning.
2. The planter seed hopper shall have a capacity of 2 to 3 tons.
3. Rows are to be partially opened prior to planting to reduce planter power requirements.
4. The planter shall be capable of completing the furrow to the desired depth and width.
5. The planter shall be capable of handling field length seed canes with adhering trash with provision for cutting the canes in half.
6. Seed canes are to be transferred from the transport cart to the planter with a winch truck in 1- to 1-1/2 ton sling loads.
7. The planter shall be of two-row design for planting one row on each side of the tractor.
8. The row spacing shall be standardized at 5 feet, 10 inches.
9. The rate of planting shall be adjustable to secure a uniform distribution of seed.
10. Power steering shall be used to assist the operator.

Prior to the planting operation the furrow is partially opened with a tractor equipped with middlebreakers and gauge wheels mounted on the rear tool bar as illustrated in figure 1. With this tool arrangement it is possible to standardize the row spacing essential for the operation of the planter.

The construction of the planting machine is illustrated in figure 2. The planter is designed to straddle one row and plant the two adjacent rows. Each row unit consists of a gauge tire (that rolls in the partially opened

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planter furrow), a middle breaker type furrow opener (with the moldboard clipped to reduce soil movement), and a planting trough consisting of two sides for holding the soil out of the planting furrow during the planting operation. The row units are raised and lowered independently at the front, thereby making it possible to plant a single row. In the raised position the unit has a ground clearance of approximately 16 inches. During the planting operation the weight of the unit is carried on the gauge tire, thus allowing the unit to float vertically independently of the remainder of the planting machine.

In the 1955 design each of the two seed hoppers was located between the feed chute and the tractor engine. It was found that this arrangement did not provide sufficient seed capacity and was difficult to load properly due to the wide variation in bundle sizes. In addition, since both hoppers were seldom exhausted at the same time, canes had to be transferred by hand between hoppers to completely empty both at the same time. The amount of trash and soil included with the cane made it necessary to completely empty the hoppers after each load to avoid an accumulation of this material on the hopper floor and prevent an excessive amount being mixed with the next load of seed cane.

To overcome some of the objections to the two-hopper arrangement the engine, propelling transmission, and wheels of the tractor were reversed, thus permitting the two seed hoppers to be combined into one large hopper. The revision provided a 10' x 10' seed hopper which was adequate for 2 to 3 tons and could be loaded from either side with the winch truck. The front wheels and axle of the tractor were removed and mounted on the front of the planter. The engine of the tractor unit was supported by extending the main frame of the planter. The chain drives of the wheel drop housing were replaced with spur gears to reverse travel direction. In low-low gear the ground speed was 1.38 mph at 1213 rpm engine speed. The method of transferring the canes from the transport carts to the planting machine is illustrated in figures 3 and 4.

The length of the seed feed mechanism was increased from 8 feet 3 inches to 10 feet 3 inches to permit two stalks of seed to be dropped simultaneously. The feeding mechanism used in 1956 consisted of a feed chute, feed roll, and saw. The seed canes were dropped lengthwise by hand, two at a time, into the feed chute. The feed roll was equipped with one row of fingers for discharging the seed cane into the planting trough. The feed roll device was changed from a constant speed drive to an interrupted drive to assist in the positive discharge of the canes and to reduce wrapping of trash on the feed cylinder. Stripping bars were provided next to each feed finger to assist in the dropping and to reduce carryover of trash. The rate of seed planting was varied by changing the frequency of discharge in relation to the forward speed. The desired rate of planting, or lines of cane per row foot, depends upon the length of the seed cane and the frequency of discharge relative to the ground speed. The desired rate was obtained by changing feed sprockets. This arrangement

permits a normal range of from 1 to 3 lines. When the seed canes were longer than the calibrated length the rate of planting was increased in direct proportion.

The field testing of the experimental two-row sugarcane planter was conducted in cooperation with Gulf States Land and Industries, Inc. (formerly Godchaux Sugars, Inc.), Raceland, La., from September 10 through 22 and on October 13. During the first test period all the seed cane was hot water treated for ratoon stunting disease. The treated seed was loaded directly on the planter at the treating plant to prevent possible contamination with untreated seed. In these tests 36 percent of the total time was spent planting, and 64 percent of the time was devoted to loading, moving, and waiting for seed. The average planting time for 24 consecutive loads was 33 minutes per load, averaging 2-1/2 to 3 tons of seed cane. Most of the cane was straight and was loaded on the planter in bundles of 1000 to 1200 pounds. The results of these plantings are summarized in the following table:

Date	Block	Cut	Acres	Variety	Tons per acre
Sept.					
10,11	C125	C, D, 17 rows of E	8.00	C.P.43-47	3.25
12	C168	6 rows of D, E, 6 rows of F	3.41	C.P.36/105	3.07
13	C88	B, C, D	2.99	C.P.48/103	4.13
14	C92	12 rows of G	1.82	C.P.48/103	4.13
15	C30	A, B, 15 rows of C	4.10	C.P.36/105	3.07
17,18,19	C177	14 rows of K, 10-1/2 rows of G, H, I, J	6.87	C.P.36/13	2.75
19	C177	10-1/2 rows of G	.88	C.P.44/155	3.41
20	C120	6 rows of C, 12 rows of D, E	3.90	C.P.44/155	3.41
22	C177	F	1.06	C.P.47/193	3.37
Oct.					
13*	C28	E, F	4.05	C.P.36/105	3.07
			37.08		

*Untreated seed, field loaded, badly bent and broken by the hurricane on September 23, 1956.

All the field testing was done without covering tools so that gaps could be filled and the canes positioned at the quarter drains and at the ends of the rows. During most of the tests one man followed the planter to fill gaps and make the quarter drain breaks. Occasionally the feed cylinder was choked by canes or trash, however the frequency of choking was not as great during the 1956 tests as in 1955. It has been observed that the frequency of choking is greater with crooked canes. On the October 13

test the hurricane-damaged seed cane was difficult to load and caused frequent chokes. It was found that two feeders per row improved the uniformity of planting and increased the travel speed of the planter.

Observations and conclusions on the operation of the two-row sugarcane planter are as follows:

1. The seed hopper had sufficient capacity to take care of the wide variation in bundle sizes and permitted two feeders to be used for each row.
2. Hydraulic steering and stronger brakes improved the handling of the planter especially when loaded.
3. The difficulty of separating the individual seed pieces because of trash is the main capacity limiting factor.
4. Hurricane-crooked seed cane was found difficult to feed without choking the feed cylinders.
5. The two-row planting machine is easy to handle and has adequate power for low ground speeds.
6. On October 13 a capacity of 5.85 acres per 9 hours was obtained when planting hurricane-crooked seed cane.
7. Pre-hurricane planting time for 24 consecutive loads of 2-1/2 to 3 tons of seed cane averaged 3.3 minutes per load.



Figure 1. Rear view of cane tractor equipped with three furrow openers and gauge wheels.

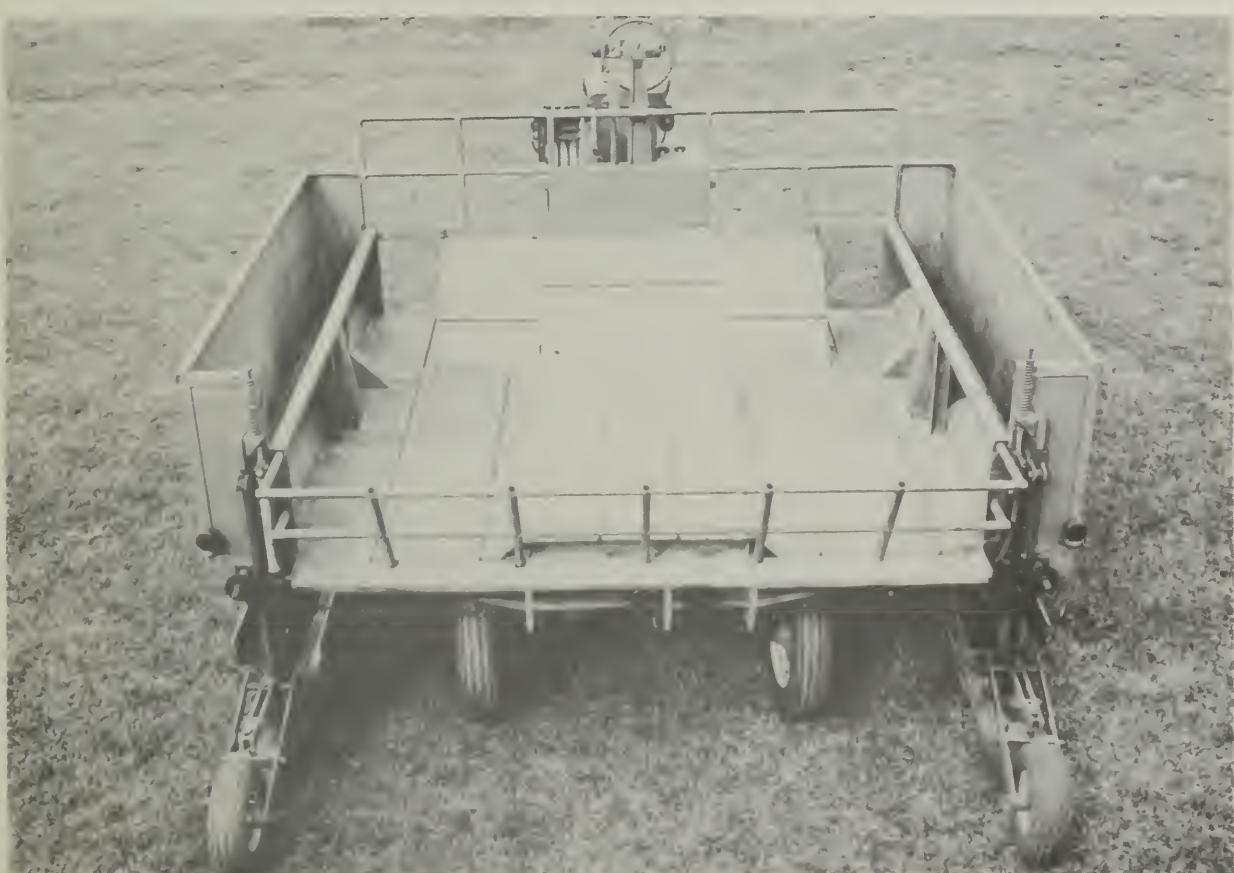


Figure 2. Front aerial view of two-row experimental sugarcane planter showing general arrangement of seed hopper, feed chute, and opener gauge tire.



Figure 3. Winch truck equipped with long boom for transferring seed cane from the transport carts to the cane planting machine.



Figure 4. Transferring seed cane from the winch truck to the experimental planter.



